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| EXAMINER | |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/593,918 | TOUR ET AL. | |
| | Examiner | Art Unit | |
| | BRITTANY M. MARTINEZ | 1793 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *22 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 September 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/16/07 and 2/1/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Status of Application*

**Claims 1-28** are pending in the instant application and have been examined.

### *Priority*

The instant application is a national stage entry of PCT/US05/09677, filed March 24, 2005, which claims the benefit of U.S. Provisional Application No. 60/556250, filed March 25, 2004.

### *Drawings*

1. Figures 6, 7, 9a and 10 are objected to for being unclear, illegible at times, and of insufficient quality for reprint in a patent publication. Refer to 37 CFR 1.84(b). Figure 2 is further objected to for improper numbering of views. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement

sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 4, 13, 25 and 27** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

4. The portion of **Claim 4** that reads ", and $HNO_3$, and combinations thereof" utilizes improper Markush terminology. See MPEP § 2173.05(h). This rejection may be overcome by amending the corresponding portion of **Claim 4** to read ", $HNO_3$, and combinations thereof."

5. With regard to **Claim 13**, it is unclear whether steps "a" and "b" are in addition to steps "a" and "b" of **Claim 1**. If the steps of **Claim 13** are meant to be additional, they need to be signified with letters other than "a" and "b."

6. With regard to **Claim 25**, it is unclear whether steps "a," "b" and "c" are in addition to steps "a," "b" and "c" of **Claim 16**. If the steps of **Claim 25** are meant to be additional, they need to be signified with letters other than "a," "b" and "c."

7. With regard to **Claim 27**, it is unclear whether steps "a" and "b" are in addition to steps "a" and "b" of **Claims 16 and 25**. If the steps of **Claim 27** are meant to be additional, they need to be signified with letters other than "a" and "b."

### *Claim Rejections - 35 USC § 102*

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. **Claims 1, 2, 4, 5, 7, 8, 10, 12 and 15** are rejected under 35 U.S.C. 102(e) as being anticipated by Cooper et al. (US 2007/0084797 A1).

10. With regard to **Claim 1**, Cooper discloses a method comprising the steps of: a) dispersing carbon nanotubes in an acidic medium to form dispersed carbon; and b) functionalizing the dispersed carbon nanotubes by covalently attaching functional groups to the sidewalls to yield sidewall functionalized carbon nanotubes (Cooper, 0036; 0049-0050; 0053; 0117; 0119; 0124; 0131). While Cooper does not explicitly

disclose the carbon nanotubes having substantially exposed sidewalls after being dispersed in the acidic medium, this limitation is anticipated by Cooper since Cooper discloses the same process and materials as that of the instant application. The carbon nanotubes of Cooper would have substantially exposed sidewalls after being dispersed in the acidic medium to no less an extent than that of **Claim 1**.

11. With regard to **Claim 2**, Cooper discloses single-wall carbon nanotubes, multi-wall carbon nanotubes, and combinations thereof (Cooper, 0048).

12. With regard to **Claims 4 and 5**, Cooper discloses the acid medium comprising $H_2SO_4$, $HNO_3$, and combinations thereof (Cooper, 0124).

13. With regard to **Claims 7, 8 and 10**, Cooper discloses the step of functionalizing involving a functionalizing agent selected from the group consisting of compounds including at least one chemical group selected from the group consisting of carboxyl, amine, polyamide, polyamphiphiles, diazonium salts, pyrenyl, silane and combinations thereof, fluorine compounds of boron, titanium, niobium, or tungsten, and halogenated compounds (Cooper, 0049-0051).

14. With regard to **Claim 12**, Cooper discloses at least one post-processing step selected from the group consisted of diluting, filtering, washing, drying, and combinations thereof (Cooper, 0126; 0174-0175; 0178; 0193; 0200; 0202).

15. With regard to **Claim 15**, Cooper does not explicitly disclose the functionalized carbon nanotubes having at least about 1 functional group per every 100 carbon nanotube carbons; however, Cooper anticipates this limitation since Cooper discloses the same process using the same materials as that of the instant application. The

functionalized carbon nanotubes of Cooper would have at least about 1 functional group per every 100 carbon nanotube carbons to no less an extent than that of the instant application.

16. **Claims 1-5, 7 and 12-15** are rejected under 35 U.S.C. 102(e) as being anticipated by Khabashesku et al. (US 7,125,533).

17. The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

18. With regard to **Claim 1**, Khabashesku discloses a method comprising the steps of: a) dispersing carbon nanotubes in an acidic medium to form dispersed carbon; and b) functionalizing the dispersed carbon nanotubes by covalently attaching functional groups to the sidewalls to yield sidewall functionalized carbon nanotubes (Khabashesku, Abstract; c. 7, l. 66-67; c. 8, l. 1-67; c. 9, l. 1-67; c. 10, l. 1-67; c. 11, l. 1-67; c. 12-c. 14; Examples; Claims 1-7). While Khabashesku does not explicitly disclose the carbon nanotubes having substantially exposed sidewalls after being dispersed in the acidic medium, this limitation is anticipated by Khabashesku since Khabashesku discloses the same process and materials as that of the instant application. The carbon

nanotubes of Khabashesku would have substantially exposed sidewalls after being dispersed in the acidic medium to no less an extent than that of **Claim 1**.

19. With regard to **Claim 2**, Khabashesku discloses single-wall carbon nanotubes, multi-wall carbon nanotubes, and combinations thereof (Khabashesku, Abstract; Claims 1 and 5).

20. With regard to **Claim 3**, Khabashesku discloses the acid medium comprising a superacid (Khabashesku, c. 7, l. 66-67; c. 8, l. 1-8).

21. With regard to **Claims 4 and 5**, Khabashesku discloses the acid medium comprising $H_2SO_4$, $H_3PO_4$, $HNO_3$, and combinations thereof (Khabashesku, c. 7, l. 66-67; c. 8, l. 1-8).

22. With regard to **Claim 7**, Khabashesku discloses the step of functionalizing involving carbon radicals (Khabashesku, Abstract; c. 7, l. 66-67; c. 8, l. 1-67; c. 9, l. 1-67; c. 10, l. 1-67; c. 11, l. 1-67; c. 12-c. 14; Examples; Claims 1-7).

23. With regard to **Claim 12**, Khabashesku discloses at least one post-processing step selected from the group consisted of diluting, filtering, washing, drying, and combinations thereof (Khabashesku, Abstract; c. 7, l. 66-67; c. 8, l. 1-67; c. 9, l. 1-67; c. 10, l. 1-67; c. 11, l. 1-67; c. 12-c. 14; Examples).

24. With regard to **Claim 13**, Khabashesku discloses isolating the sidewall functionalized carbon nanotubes from the acidic medium by filtering to yield isolated sidewall functionalized carbon nanotubes; and resuspending the isolated sidewall functionalized carbon nanotubes in a solvent (Khabashesku, Examples 2 and 5).

25. With regard to **Claim 14**, Khabashesku discloses water as the solvent (Example 5).

26. With regard to **Claim 15**, Khabashesku does not explicitly disclose the functionalized carbon nanotubes having at least about 1 functional group per every 100 carbon nanotube carbons; however, Khabashesku anticipates this limitation since Khabashesku discloses the same process using the same materials as that of the instant application. The functionalized carbon nanotubes of Khabashesku would have at least about 1 functional group per every 100 carbon nanotube carbons to no less an extent than that of the instant application.

27. **Claims 1, 2, 4, 5, 7-10, 12 and 15** are rejected under 35 U.S.C. 102(b) as being anticipated by Dyke et al. (*JACS*).

28. With regard to **Claim 1**, Dyke discloses a method comprising the steps of: a) dispersing carbon nanotubes in an acidic medium to form dispersed carbon; and b) functionalizing the dispersed carbon nanotubes by covalently attaching functional groups to the sidewalls to yield sidewall functionalized carbon nanotubes (Dyke, p. 1156). While Dyke does not explicitly disclose the carbon nanotubes having substantially exposed sidewalls after being dispersed in the acidic medium, this limitation is anticipated by Dyke since Dyke discloses the same process and materials as that of the instant application. The carbon nanotubes of Dyke would have substantially exposed sidewalls after being dispersed in the acidic medium to no less an extent than that of **Claim 1**.

29. With regard to **Claim 2**, Dyke discloses single-wall carbon nanotubes, multi-wall carbon nanotubes and combinations thereof (Dyke, p. 1156-1157).

30. With regard to **Claims 4 and 5**, Dyke discloses the acid medium comprising $H_2SO_4$ (Dyke, p. 1156).

31. With regard to **Claims 7-10**, Dyke discloses the step of functionalizing involving a diazonium species provided as a diazonium salt or generated *in situ* by reaction of an aniline species with a nitrite species (Dyke, p. 1156).

32. With regard to **Claim 12**, Dyke discloses at least one post-processing step selected from the group consisted of diluting, filtering, washing, drying, and combinations thereof (Dyke, p. 1156).

33. With regard to **Claim 15**, Dyke does not explicitly disclose the functionalized carbon nanotubes having at least about 1 functional group per every 100 carbon nanotube carbons; however, Dyke anticipates this limitation since Dyke discloses the same process using the same materials as that of the instant application. The functionalized carbon nanotubes of Dyke would have at least about 1 functional group per every 100 carbon nanotube carbons to no less an extent than that of the instant application.

34. **Claims 1, 6 and 15** are rejected under 35 U.S.C. 102(e) as being anticipated by Niu et al. (US 7,070,753 B2).

35. With regard to **Claims 1 and 6**, Niu discloses a method comprising the steps of: a) dispersing carbon nanotubes in a persulfate species to form dispersed carbon; and b)

functionalizing the dispersed carbon nanotubes by covalently attaching functional groups to the sidewalls to yield sidewall functionalized carbon nanotubes (Niu, Abstract, Claims 1 and 5-7). While Niu does not explicitly disclose the carbon nanotubes having substantially exposed sidewalls after being dispersed in the acidic medium, this limitation is anticipated by Niu since Niu discloses the same process and materials as that of the instant application. The carbon nanotubes of Niu would have substantially exposed sidewalls after being dispersed in the acidic medium to no less an extent than that of **Claim 1**.

36. With regard to **Claim 15**, Niu does not explicitly disclose the functionalized carbon nanotubes having at least about 1 functional group per every 100 carbon nanotube carbons; however, Niu anticipates this limitation since Niu discloses the same process using the same materials as that of the instant application. The functionalized carbon nanotubes of Niu would have at least about 1 functional group per every 100 carbon nanotube carbons to no less an extent than that of the instant application.

### *Claim Rejections - 35 USC § 103*

37. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

38. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

39. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

40. **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Khabashesku et al. (US 7,125,533) as applied to **Claim 1** above, and further as discussed below.

41. Khabashesku does not explicitly disclose the functionalized carbon nanotubes having at least about 1 functional group per every 100 carbon nanotube carbons. However, an expected functionalization amount/frequency is a result effective variable since one of ordinary skill in the art would expect different properties in the process and resulting product as such amount varies. Since the functionalization amount/frequency

is a result effective variable, it is within the skill of one of ordinary skill in the art to develop a suitable functionalization extent/frequency for the carbon nanotubes. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

42. **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Dyke et al. (*JACS*) as applied to **Claim 1** above, and further as discussed below.

43. Dyke does not explicitly disclose the functionalized carbon nanotubes having at least about 1 functional group per every 100 carbon nanotube carbons. However, an expected functionalization amount/frequency is a result effective variable since one of ordinary skill in the art would expect different properties in the process and resulting product as such amount varies. Since the functionalization amount/frequency is a result effective variable, it is within the skill of one of ordinary skill in the art to develop a suitable functionalization extent/frequency for the carbon nanotubes. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

44. **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Cooper et al. (US 2007/0084797 A1) as applied to **Claim 1** above, and further as discussed below.

45. Cooper does not explicitly disclose the functionalized carbon nanotubes having at least about 1 functional group per every 100 carbon nanotube carbons. However, an expected functionalization amount/frequency is a result effective variable since one of ordinary skill in the art would expect different properties in the process and resulting

product as such amount varies. Since the functionalization amount/frequency is a result effective variable, it is within the skill of one of ordinary skill in the art to develop a suitable functionalization extent/frequency for the carbon nanotubes. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

46. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Cooper et al. (US 2007/0084797 A1) as applied to **Claims 1 and 8** above, and further in view of Dyke et al. (*JACS*).

47. Cooper does not disclose the diazonium species generated *in situ* by reaction of an aniline species with a nitrite species (**Claim 9**).

48. With regard to **Claim 9**, it is well-known in the art that diazonium species may be generated *in situ* by reaction of an aniline species with a nitrite species, and used in the functionalization of carbon nanotubes, as evidenced by Dyke (Dyke, p. 1156).

49. Thus, it would have been obvious to one of ordinary skill in the art to try to modify the process of Cooper with the diazonium species generated *in situ* by reaction of an aniline species with a nitrite species as taught by Dyke because one of ordinary skill in the art could have pursued the known potential diazonium species generation options within his or her technical grasp with a reasonable expectation of success.

50. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over Cooper et al. (US 2007/0084797 A1) as applied to **Claims 1 and 8** above, and further in view of Csuzdi et al. (US 6,600,036 B2).

51. Cooper does not disclose the diazonium species generated from a triazene precursor (**Claim 11**).

52. With regard to **Claim 11**, it is well-known in the art that triazene precursors are obvious variants of diazonium salts, as evidence by Csuzdi (Csuzdi, c. 8, l. 57-58).

53. Thus, it would have been obvious to one of ordinary skill in the art to try to modify the process of Cooper with the triazene precursors of Csuzdi because one of ordinary skill in the art could have pursued the known potential diazonium species options within his or her technical grasp with a reasonable expectation of success.

54. **Claims 16-20 and 22-28** are rejected under 35 U.S.C. 103(a) as being obvious over Khabashesku et al. (US 7,125,533) in view of Cooper et al. (US 2007/0084797 A1), and further in view of Dyke et al. (*JACS*).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the

application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

55. With regard to **Claim 16**, Khabashesku discloses a method comprising the steps of: a) dispersing single-wall carbon nanotubes in a superacid medium to form a dispersion; and b) functionalizing the dispersed carbon nanotubes by covalently attaching functional groups to the sidewalls to yield sidewall functionalized carbon nanotubes (Khabashesku, Abstract; c. 7, l. 66-67; c. 8, l. 1-67; c. 9, l. 1-67; c. 10, l. 1-67; c. 11, l. 1-67; c. 12-c. 14; Examples; Claims 1-7). The difference between the process of Khabashesku and that of **Claim 16** is Khabashesku does not disclose adding aniline species and a nitrite species to the dispersion to form a reaction mixture; or reacting the reaction mixture to form functionalized single-wall carbon nanotubes. With regard to **Claim 16**, Cooper discloses a method comprising the steps of: a) dispersing carbon nanotubes in an acidic medium to form dispersed carbon; and b) functionalizing the dispersed carbon nanotubes by covalently attaching functional groups to the sidewalls to yield sidewall functionalized carbon nanotubes (Cooper, 0036; 0049-0050; 0053; 0117; 0119; 0124; 0131), wherein the step of functionalizing involves diazonium salts (Cooper, 0049-0051). With regard to **Claim 16**, it is well-known in the art that diazonium species may be generated *in situ* by reaction of an aniline species with a nitrite species, and used in the functionalization of carbon nanotubes, as evidenced by Dyke (Dyke, p. 1156). Thus, it would have been obvious to one of ordinary skill in the

art to try to modify the process of the aforementioned applied art with the diazonium species generated *in situ* by reaction of an aniline species with a nitrite species as taught by Dyke because one of ordinary skill in the art could have pursued the known potential diazonium species generation options within his or her technical grasp with a reasonable expectation of success.

56. With regard to **Claim 17**, Khabashesku discloses the single-wall carbon nanotubes oxidatively treated (Khabashesku, Examples).

57. With regard to **Claim 18**, Khabashesku discloses the single-wall carbon nanotubes homogeneous in length and diameter (Khabashesku, Examples).

58. With regard to **Claim 19**, Khabashesku discloses the step of filtering the dispersion to remove any large particles (Khabashesku, Examples).

59. With regard to **Claim 20**, Khabashesku discloses the superacid medium being selected from the group consisting of oleum, chlorosulfonic acid, and combinations thereof (Khabashesku, Abstract; c. 7, l. 66-67; c. 8, l. 1-67).

60. With regard to **Claim 22**, Khabashesku discloses a step of adding a radical source to the reaction mixture (Khabashesku, Abstract; c. 7, l. 66-67; c. 8, l. 1-67; c. 9, l. 1-67; c. 10, l. 1-67; c. 11, l. 1-67; c. 12-c. 14; Examples).

61. With regard to **Claim 23**, Khabashesku discloses the radical source being benzoyl peroxide (Khabashesku, Abstract; c. 7, l. 66-67; c. 8, l. 1-67; c. 9, l. 1-67; c. 10, l. 1-67; c. 11, l. 1-67; c. 12-c. 14; Examples).

62. With regard to **Claim 24**, Khabashesku discloses the step of reacting comprising heating and stirring (Khabashesku, Examples).

63. With regard to **Claim 25**, Khabashesku discloses diluting the reaction mixture with water, subsequent to forming functionalized single-wall carbon nanotubes, to form a diluted reaction product mixture; filtering the diluted reaction mixture over a filter to isolate the functionalized single-wall carbon nanotubes, and washing the isolated functionalized single-wall carbon nanotubes with a washing solvent to obtain washed functionalized single-wall carbon nanotubes (Khabashesku, Abstract; c. 7, l. 66-67; c. 8, l. 1-67; c. 9, l. 1-67; c. 10, l. 1-67; c. 11, l. 1-67; c. 12-c. 14; Examples).

64. With regard to **Claim 26**, Khabashesku discloses the washing solvent being acetone (Khabashesku, Examples).

65. With regard to **Claim 27**, Khabashesku discloses resuspending the washed functionalized single-wall carbon nanotubes in water to form a re-suspension; and filtering the re-suspension to recover rewashed functionalized single-wall carbon nanotubes (Khabashesku, Examples 2 and 5).

66. With regard to **Claim 28**, Khabashesku does not explicitly disclose the functionalized carbon nanotubes having at least about 1 functional group per every 100 carbon nanotube carbons; however, Khabashesku anticipates this limitation since Khabashesku discloses the same process using the same materials as that of the instant application. The functionalized carbon nanotubes of Khabashesku would have at least about 1 functional group per every 100 carbon nanotube carbons to no less an extent than that of the instant application.

67. **Claim 21** is rejected under 35 U.S.C. 103(a) as being obvious over Khabashesku et al. (US 7,125,533) in view of Cooper et al. (US 2007/0084797 A1), and further in view of Dyke et al. (*JACS*), as applied to **Claim 16** above, and further in view of Yu et al. (US 6,399,202 B1).

68. The aforementioned applied art does not disclose the aniline species comprising sulfanilic acid. However, sulfanilic acid is a well-known aniline species used to produce diazonium species, as evidenced by Yu (Yu, Examples). Thus, it would have been obvious to one of ordinary skill in the art to try to modify the process disclosed by the aforementioned applied art with the sulfanilic acid of Yu because one of ordinary skill in the art could have pursued the known potential aniline species used to produce diazonium species within his or her technical grasp with a reasonable expectation of success.

***Double Patenting***

69. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to

be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

70. **Claims 1, 2, 4, 5, 7-10, 15, 16, 20, 24 and 28** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 1-5, 11, 20 and 25 of U.S. Patent No. 7,459,137. Although the conflicting claims are not identical, they are not patentably distinct from each other because U.S. Patent No. 7,459,137 discloses a method comprising the steps of: a) dispersing carbon nanotubes in an acidic medium to form dispersed carbon; and b) functionalizing the dispersed carbon nanotubes by covalently attaching functional groups to the sidewalls to yield sidewall functionalized carbon nanotubes, substantially as in the instant application.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRITTANY M. MARTINEZ whose telephone number is (571) 270-3586. The examiner can normally be reached on Monday-Friday 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BMM
/Brittany M Martinez/
Examiner, Art Unit 1793

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